REMARKS

Reconsideration and allowance of the subject application are respectfully solicited.

Claims 1 through 11 are pending, with Claim 1 being independent. Claims 1, 7, and 9 have been amended. Claim 10 was indicated as being allowable if rewritten in independent form and to overcome the rejection under 35 U.S.C. § 112, 2nd paragraph, discussed below. Applicant has respectfully maintained that claim in dependent form. The specification has been amended.

The specification was objected to on the grounds that (a) ΔY is defined on page 17 as the amount of aberration, and on page 23 as the amount of image shake correction; (b) α'_k at pages 18-19 is not defined; (c) the symbol E4s is used at page 23, while the symbol E is used at page 29; and (d) both 4S and 4F are used with respect to the first lens subunit of the fourth lens unit. All objections are respectfully traversed, and are submitted to have been obviated by the amendment of the specification in a manner believed to avoid the grounds of objection. In particular, as to (a), the specification has been amended at page 23 to add a subscript --p- -to "ΔY". As to (b), the definition of α'_k has been added at page 17 (see page 23, lines 27 and 28). As to (c), "E" has been changed to --E4s-- as kindly suggested. As to (d), "4S" has been changed to --4F-- as kindly suggested. Favorable consideration is earnestly solicited.

Claims 1, 6, and 9 and their dependent claims were rejected under 35 U.S.C. § 112, 2nd paragraph, on the grounds that the expressions (a) "an image is displaced by moving said first lens subunit in such a way as to have a component perpendicular to an optical axis of said zoom lens" (Claim 1), (b) "converted inclination angle of incidence" and "converted inclination angle of exit" (Claim 6), and (c) "rate of variation of lateral magnification" (Claim

11) are indefinite. All rejections are respectfully traversed. As to (a) and (c), the claims have been amended in a manner respectfully believed to avoid the grounds of rejection. As to (b), Applicant respectfully submits that the artisan would have readily understood the objected to term "converted" to refer to a value normalized by α'_k.

Claims 1 through 5, 7, and 8 were rejected under 35 U.S.C. § 102 over U.S. Patent No. 6,025,962 (Suzuki). Claim 11 was rejected under 35 U.S.C. 103 over Suzuki in view of U.S. Patent No. 4,054,372 (Schroeder). All rejections are respectfully traversed.

Claim 1 recites, inter alia, that the fourth lens unit (with the first lens subunit having the component of motion) is stationary during variation of magnification.

However, Applicant respectfully submits that neither Suzuki (which corresponds to Japanese Laid-Open Patent Application No. 10-90601 referenced at page 5 of the specification) nor Schroeder, even in combination, assuming, arguendo, that the documents could be combined, discloses or suggests at least the above-discussed claimed features as recited, inter alia, in Claim 1. It is further respectfully submitted that there has been no showing of any indication of motivation in the cited documents that would lead one having ordinary skill in the art to arrive at such claimed features. Applicant respectfully submits that by means of such features, the beneficial effect discussed at page 22, lines 14 through 27 of the specification may be obtained.

The dependent claims are also submitted to be patentable because they set forth additional aspects of the present invention and are dependent from independent claims discussed above. Therefore, separate and individual consideration of each dependent claim is respectfully requested.

Applicant submits that this application is in condition for allowance, and a Notice of Allowance is respectfully requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,

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MARKED UP CLAIM SHEET

1. (Amended) A zoom lens comprising, in order from an object side to an image side:

a first lens unit of positive refractive power;

a second lens unit of negative refractive power arranged to move during variation of magnification;

a third lens unit arranged to compensate for shift of an image plane due to the variation of magnification; and

a fourth lens unit of positive refractive power,

wherein said fourth lens unit has a first lens subunit of negative refractive power, and an image is displaced by moving said first lens subunit in such a way [as to have] that said first lens subunit has a component of motion in a direction perpendicular to an optical axis of said zoom lens, and

wherein said fourth lens unit is stationary during variation of magnification.

7. (Amended) A zoom lens according to claim 4, wherein the following condition is satisfied:

$$vn[(4S)](4F) - vp[(4S)](4F) > 10$$

where vn[(4S)](4F) is, when said first lens subunit includes only one negative lens, an Abbe number of material of the negative lens included in said first lens subunit or, when said first lens

subunit includes a plurality of negative lenses, a mean value of Abbe numbers of material of all the negative lenses included in said first lens subunit, and vp[(4S)](4F) is, when said first lens subunit includes only one positive lens, an Abbe number of material of the positive lens included in said first lens subunit or, when said first lens subunit includes a plurality of positive lenses, a mean value of Abbe numbers of material of all the positive lenses included in said first lens subunit.

9. (Amended) A zoom lens according to claim 1, wherein an image forming magnification of said second lens unit varies within a range including -1× during the variation of magnification, an image forming magnification of said third lens unit varies within a range including -1× during the variation of magnification, and the following conditions are satisfied:

$$5 < Z2$$

$$0.15 < Z2 / Z$$

where Z2 is a [rate] ratio of [variation of lateral] magnification of said second lens unit at the telephoto end to the magnification of said second lens unit at the wide-angle end, and Z is a zoom ratio of said zoom lens.

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VERSION SHOWING CHANGES MADE TO THE SPECIFICATION

Please substitute the following paragraph for the paragraph starting at page 10, line 1 and ending at line 16.

In accordance with a preferred aspect of the invention, in the zoom lens, the following condition is satisfied:

$$\nu n[(4S)](4F) - \nu p[(4S)](4F) > 10$$

where $\nu n[(4S)](4F)$ is, when the first lens subunit includes only one negative lens, an Abbe number of material of the negative lens included in the first lens subunit or, when the first lens subunit includes a plurality of negative lenses, a mean value of Abbe numbers of material of all the negative lenses included in the first lens subunit, and $\nu p[(4S)](4F)$ is, when the first lens subunit includes only one positive lens, an Abbe number of material of the positive lens included in the first lens subunit or, when the first lens subunit includes a plurality of positive lenses, a mean value of Abbe numbers of material of all the positive lenses included in the first lens subunit.

Please substitute the following paragraph for the paragraph starting at page 17, line 4 and ending at line 16.

The amount of aberration $\Delta'Y$ of the entire lens system occurring when a lens unit p that is a part of the photographic lens is parallel-decentered by a distance E becomes the sum of

the amount of aberration ΔY occurring before the parallel-decentering and the amount of decentering aberration $\Delta Y(E)$ produced by the parallel-decentering, as shown in the equation (a). Here, the amount of decentering aberration $\Delta Y(E)$ is represented, as shown in the equation (b), by using primary decentering coma (IIE), primary decentering astigmatism (IIIE), primary decentering curvature of field (PE), primary decentering distortion (VE1), primary decentering surplus distortion (VE2) and primary original point shift ΔE. (α'_k is the converted inclination angle of exit of outermost surface k in the entire lens system.)

Please substitute the following paragraph for the paragraph starting at page 23, line 13 and ending at line 22.

First, the conditions under which the image-stabilizing lens unit is made small in size and light in weight and is made optimum in terms of optical performance will be described in the following. The amount of decentering E4s of the image-stabilizing lens unit required for obtaining a predetermined amount of image-shake correction $[\Delta Y]$ ΔY_p on an image plane is expressed by the following equation (m) on the basis of the equation (b) with $R = 0$, $\omega = 0$ and $\alpha_k' = 1$.

$$E4s = [-\Delta Y] \, -\Delta Y_p / \{2(\Delta E)\} \qquad \ldots (m)$$

Please substitute the following paragraph for the paragraph starting at page 23, line 23 and ending at page 24, line 4.

Since the primary original point shift (ΔE) is expressed by the equation (h), the amount of decentering E4s required for obtaining a necessary amount of image-shake correction

[ΔY] $\underline{\Delta Y_p}$ is defined by using a converted inclination angle of incidence α and a converted inclination angle of exit α′ of an on-axial marginal ray on and from the image-stabilizing lens unit. Accordingly, the zoom lens is made to satisfy the following condition (1):

$$\alpha' - \alpha < -0.45 \qquad \ldots(1)$$

Please substitute the following paragraph for the paragraph starting at page 25, line 15 and ending at page 26, line 3.

Accordingly, the zoom lens is made to satisfy the following condition (2):

$$\nu n[(4S)]\underline{(4F)} - \nu p[(4S)]\underline{(4F)} > 10 \qquad \ldots(2)$$

where $\nu n[(4S)]\underline{(4F)}$ is, when the image-stabilizing lens unit includes only one negative lens, an Abbe number of material of the negative lens included in the image-stabilizing lens unit or, when the image-stabilizing lens unit includes a plurality of negative lenses, a mean value of Abbe numbers of material of all the negative lenses included in the image-stabilizing lens unit, and $\nu p[(4S)]\underline{(4F)}$ is, when the image-stabilizing lens unit includes only one positive lens, an Abbe number of material of the positive lens included in the image-stabilizing lens unit or, when the image-stabilizing lens unit includes a plurality of positive lenses, a mean value of Abbe numbers of material of all the positive lenses included in the image-stabilizing lens unit.

Please substitute the following paragraph for the paragraph starting at page 28, line 21 and ending at page 29, line 16.

Further, in the zoom lens according to embodiment of the invention, an optical system (4E) for shifting the range of variable magnification toward the telephoto side or the

wide-angle side may be made to be located on the image side of the image-stabilizing lens unit by such a unit switching method as to detachably insert a lens unit, such as a built-in extender conversion optical system. In that instance, it is unnecessary to change the control of the image-stabilizing lens unit before and after the shift of the range of variable magnification. Fig. 27B is an optical conceptual diagram showing the zoom lens when the extender conversion optical system (focal-length conversion optical system) 4E is inserted in a position on the image side of the image-stabilizing lens unit. Since, as shown in Fig. 27B, the disposition of lens units on the object side of the image-stabilizing lens unit does not change before and after the shift of the focal length due to the insertion or detachment of the extender conversion optical system 4E, the amount of decentering [E] E4s of the image-stabilizing lens unit required for obtaining a desired correction angle θ also does not change, so that it is unnecessary to change the control of the image-stabilizing lens unit.

Please substitute the following paragraph for the paragraph starting at page 30, line 25 and ending at page 31, line 12.

The image-stabilizing lens unit is composed of one negative lens and one positive lens. When a converted inclination angle of incidence of a light flux on the image-stabilizing lens unit is denoted by α, a converted inclination angle of exit of a light flux from the image-stabilizing lens unit [4S] 4F denoted by α′, an Abbe number of material of the negative lens of the image-stabilizing lens unit is denoted by vn[(4S)](4F), and an Abbe number

of material of the positive lens of the image-stabilizing lens unit is denoted by vp[(4S)](4F), the above-mentioned conditions (1) and (2) are satisfied as shown by the following values:

$\alpha' - \alpha = -0.503$

$vn[(4S)](4F) - vp[(4S)](4F) = 22.7$

$(vn[(4S)](4F) = 46.6,$

$vp[(4S)](4F) = 23.9)$

Please substitute the following paragraph for the paragraph starting at page 35, line 3 and ending at line 24.

The fourth lens unit is composed of a lens subunit 4F of negative refractive power and a lens subunit 4R of positive refractive power. The whole lens subunit 4F serves as the image-stabilizing lens unit, having the function of moving in a direction perpendicular to the optical axis for the purpose of stabilizing an image. The image-stabilizing lens unit is composed of two negative lenses and one positive lens. When a converted inclination angle of incidence of a light flux on the image-stabilizing lens unit is denoted by α, a converted inclination angle of exit of a light flux from the image-stabilizing lens unit is denoted by α', a mean value of Abbe numbers of material of the negative lenses of the image-stabilizing lens unit is denoted by vn[(4S)](4F), and an Abbe number of material of the positive lens of the image-stabilizing lens

unit is denoted by vp[(4S)](4F), the above-mentioned conditions (1) and (2) are satisfied as shown by the following values:

$$\alpha' - \alpha = -0.848$$

$$vn[(4S)](4F) - vp[(4S)](4F) = 12.5$$

$$(vn[(4S)](4F) = 40.8,$$

$$vp[(4S)](4F) = 28.3)$$

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In re Application of: RYUJI NURISHI

Docket No. 00865.004499 (865.4499)

Examiner: D. Raizen

Appln. No.: 09/669,664

Group Art Unit: 2873

Filed: September 26, 2000

For: ZOOM LENS AND PHOTOGRAPHING APPARATUS HAVING THE SAME

Date: December 20, 2002

COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Transmitted herewith is an Amendment in the above-identified application.

[X] No additional fee is required.

The fee has been calculated as shown below:

CLAIMS AS AMENDED						
	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL FEE
TOTAL CLAIMS	11	MINUS	20	= 0	x $ 9 $18	$ 0.00
INDEP. CLAIMS	1	MINUS	3	= 0	x $42 $84	$ 0.00
Fee for Multiple Dependent claims $140/$280						
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT---						$ 0.00

[ ] °Verified Statement claiming small entity status is enclosed, if not filed previously.

[ ] A check in the amount of $____ is enclosed.

[ ] Charge $____ to Deposit Account No. 06-1205. A duplicate of this sheet is enclosed.

[X] Any prior general authorization to charge an issue fee under 37 C.F.R. § 1.18 to Deposit Account No. 06-1205 is hereby revoked. The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required during the entire pendency of this application, or to credit any overpayment, to Deposit Account No. 06-1205. A duplicate of this paper is enclosed.

[X] A check in the amount of $110.00 to cover the Extension fee for response within one month is enclosed.

[ ] A check in the amount of $____ to cover the Information Disclosure Statement fee is enclosed.

[X] Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

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